NOAH'S FLOOD

IN

GEOLOGY and HISTORY and the BRIEF ANTIQUITY OF MANKIND.

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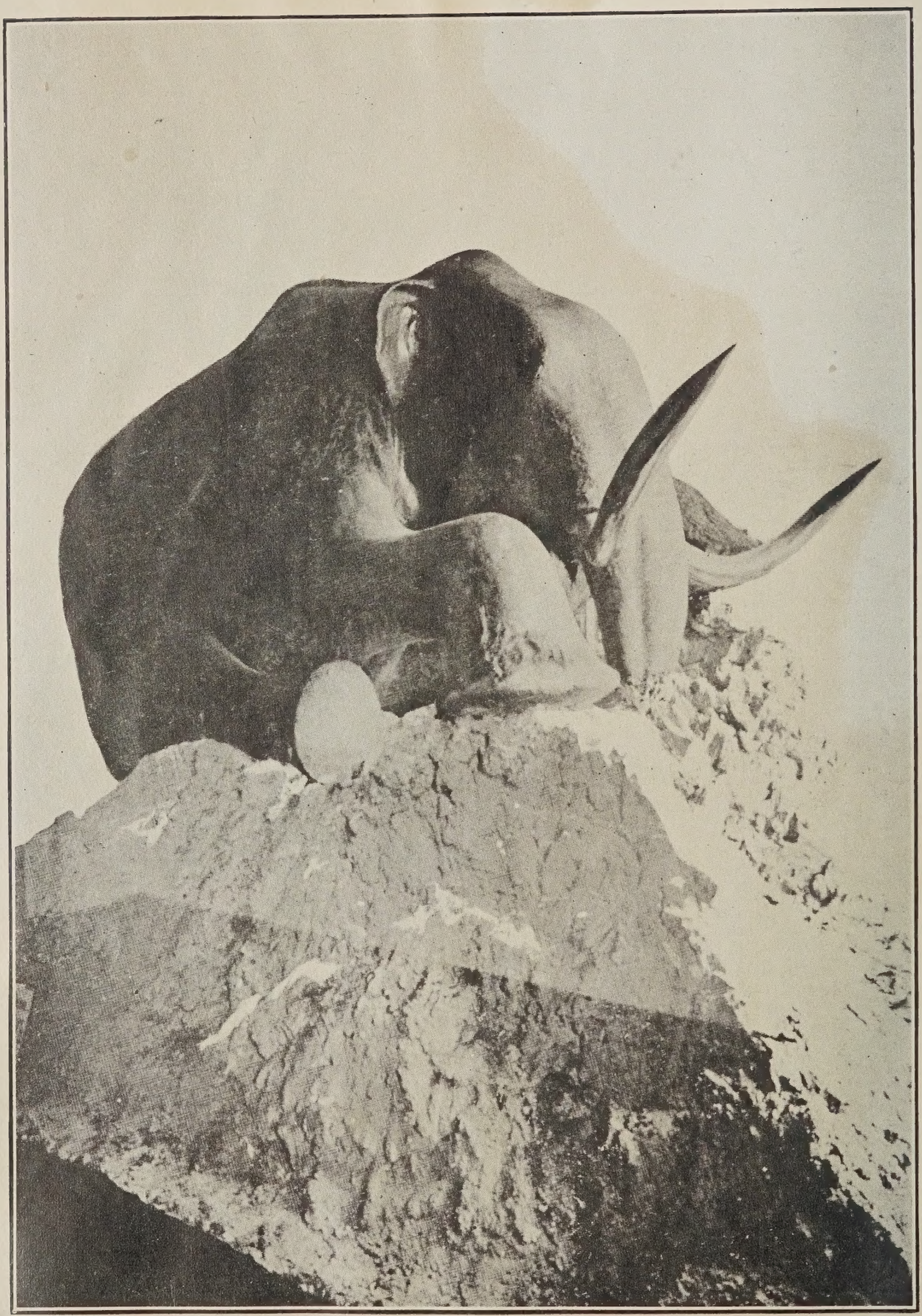

PHOTOGRAPH OF A MAMMOTH AS HE WAS FOUND, AND IS NOW MOUNTED IN THE MUSEUM OF THE ST. PETERSBURG ACADEMY

NOAH'S FLOOD

IN

Geology and History

AND THE

Brief Antiquity of Mankind

TWO LETTERS to the
"TORONTO GLOBE"

by

Martin Luther Rouse, B.A., Toronto
(BARRISTER-AT-LAW)

TOGETHER WITH

Public Correspondence Thereon and Mathematical Tables

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Did the Flood Cover the Earth.

(*From the Toronto "Globe," March* 6, 1909.)

Mr. Martin Luther Rouse of this city, a member of the Council of the Royal Victoria Institute, and an ardent student of Biblical chronology, who was the permanent lecturer in charge of the Assyrian and Egyptian antiquities in the recent Palestine Exhibition in London, sends The Globe the following interesting article traversing the line taken by Rev. George Jackson that science is against any literal view of the first few chapters of Genesis. He says:—

Your space, sir, and my own time alike forbid my meeting Mr. Jackson here and now upon every point. But one thing I will briefly establish, the testimony of science to the Flood.

Somewhere in the quaternary age—that is, the age when the land assumed its present varied surface of hill and dale, the great continents sank and rose again. We know that they sank then, firstly, because western Europe, northwestern Africa and eastern North America have ancient shore lines from twenty to a hundred and twenty miles out beneath the sea, between which and the present shores run many ancient river channels, sloping up to the mouths of present-day rivers —so many, indeed, that one is sure that only the blocking up of one here and there with sea-ooze has prevented us from finding every present-day river-bed continued under the sea. Among those who have worked this fact out from authoritative soundings, I may mention the explorer Dr. Nansen, Professor Edward Hull, Professor Jervis of Turin, besides an American geologist whose name has escaped me. Again, there are found in the Caspian Sea and in Lake Baikal, which both lie 1,200 miles from the nearest inlet of the Arctic Ocean, seals of practically the same species as swim in that ocean, and that although Lake Baikal lies 1,500 feet higher than the ocean—facts which were mentioned by Prof. Frederick Wright, the explorer and geologist, in his recent lectures here. And

lastly, in Lake Tanganyika—a vast sheet of fresh water in east Central Africa, 600 miles from the Indian Ocean—there are found a multitude of salt-water animals brought thither, as argued and maintained by their discoverer, Mr. W. H. Hudleston, late President of the Geological Society, through the agency of a mighty flood more recent at all events than the miocene epoch: nearer than that he cannot determine; but that means either in the epoch just preceding the human or in the human epoch itself.

Continents Rose Again.

And the great continents rose again, though to a less height than before, by several thousand feet (the drop from the present shore line to the foot of the cliffs which made the old shore line being on the French and Spanish coast, for instance, about 4,500 feet). That they rose again is proved, for example, by the beaches full of recent shells found on the Wicklow Hills in Ireland and the Flintshire Hills in Wales at a height of 1,250 feet, and upon hills in the Isle of Wight at a height of 450 feet, and again upon the cliffs of Trebizond south of the Black Sea at a height of 750 feet. North of the last named there is no elevation at all approaching this until one comes to the Arctic Ocean. This harmonizes with the finding of seals in the Caspian Sea and Lake Baikal, showing that the whole of Russia, Turkestan and Siberia were once in the quaternary, or human, epoch covered by the sea. Vast plains about the Caspian Sea "white with salt and sprinkled with marine shells," as Hugh Miller points out, confirm the same conclusion; while the extension of the loess, a top alluvial clay, from China across Mongolia and Tibet, Russia and the basins of the Danube and the Rhine, to Belgium and northern France proves, together with the raised beaches of England aforesaid, that the mighty inundation covered the whole of Asia north of the Himalayas, besides Russia and all Oriental and western Europe. (Professors Hull and Wright, together with Sir Henry Howorth, are my authorities here, Professor Wright's personal testimony as to Trebizond being given in his recent Toronto lectures).

The evidence of the submarine river channels and of the marine creatures found in Lake Tanganyika and other evidence that we are about to give prove further that the sea covered the greater part of Africa and of North America: while

the raised beaches found at different heights upon the cliffs of Norway may point to its having covered Scandinavia besides; for the beaches may well have been halting stages of the Flood, as it slowly retreated from a region where its sinking was likely to have been hindered by accumulated ice.

Numberless Animals Died.

And it is abundantly evident that the inundation caused by the sinking of so vast a portion of the earth's surface, if not of the whole of it, caused the death of numberless land animals. The late Sir Joseph Prestwich (also a President of the Geological Society), in a lecture delivered at the Victoria Institute in 1895, dealt with this subject at considerable length. He pointed to the bone fissures found high up in the cliffs of Devonshire, of the Channel Islands, and of Gibraltar, and on top of the isolated hill of Santenay, in eastern France. These are cracks full of bones broken sharply off, not rounded by water; which are evidently the bones of animals that died there a great while ago, and long after their death fell into the cracks and got broken by pieces of rock that fell in at a later time; and a strange fact is that the bones belong in plenty to beasts of prey as well as to ruminant animals, showing that the stronger and weaker animals that died up there had fled thither to escape some common danger. Again he pointed out that in Sicily there have been found, at the foot of a great concave inland cliff, the skeletons of many hundreds of hippopotamuses buried in the mud, and that these were of every age of life; so that they did not go to die there when old, but, roaming between Africa and Sicily at a time when those lands were united by a broad isthmus now submerged, those water-loving animals were one day overwhelmed by a deluge too strong for them, which drove them against that rounded cliff as into a death-trap. Of this our honoured countryman, the late Sir William Dawson, has also written, and of other facts of a like nature in his "Meeting Place of Geology and History," and his articles for The Sunday at Home contributed shortly before his death. One may add that the French Archaeological Society found on top of the hill of Santenay the bones of many thousand horses. (See Rev. Gath Whitney's "Was There a Universal Flood?"—Rel. Tract Society, and Southall's "Epoch of the Mammoth"—Trubner.)

Mammoths Were Suffocated.

And what shall we say of the mammoths found sometimes encased in blocks of ice, sometimes covered with mud, in northern Siberia? The first of these was found collapsed upon a hillock and imbedded in ice; and when at last it melted out the dogs of the hunter who discovered it freely ate its flesh, while he and his friends even cooked some and found it savoury: yet nearly all the skin was preserved and now covers the stuffed body, which is mounted on a fac-simile of the hillock and in the posture in which it was discovered. A strange phenomenon was presented by its skin and by the skins of such other mammoths as have been preserved—their capillary veins were full of blood. Now this is always a token of death by suffocation. But there was no sign of fire or smoke upon them (as the tufts of rusty hair by means of which they have been distinguished from southern elephants sufficiently prove); while the fact that those found imbedded in ice had their flesh quite sound proves that they must have been frozen immediately after death, which could have happened only if they were drowned. Now we all know that elephants revel in the water; that it is a second element to them. How vast, then, must have been the overflow from which these huge beasts could not escape! (See Howorth on "The Mammoth and the Flood" *et passim*. The fact about the capillaries I heard from himself; and it was confirmed to me at a meeting of the Geological Society of England as regards the first mammoth at least.)

Dawson and Palaeolithic Man.

A quarter of a century ago Sir William Dawson announced his belief that the men whom scientists describe as Palaeolithic, or belonging to the Old Stone Age, were no other than the antediluvians—the men who lived before Noah's Flood. Amongst the few skulls that had been found of these people there was one unearthed at Cromagnon, in France, that bore the marks of belonging to a man who had lived to an enormous age; for the sutures of the skull were worn out and the teeth worn down to the sockets: which would fit with the great age ascribed to the primeval patriarchs in the Bible. And again, whereas some of their remains—the ashes of their fires surrounded by implements and bones of beasts, with or without

their own skeletons—were found in caves above ground, but silted up with ancient sand, others were found deep down under a wide-stretching deposit of clay or mud, though often there in caves that were themselves buried under the soil. Now Belgium is the great centre of these finds; and there such remains sometimes lie under a clay which covers hill and dale like a skin, and which, being full of angular, unrounded stones, shows that it cannot have been formed by the wearing of a glacier, but must have been brought together by the scouring of a vast inundation. Their remains show that those ancient men were skilled hunters, spearing or entrapping all kinds of beasts; that they made bone needles right skilfully for stitching their clothes; that (to judge from two statuettes that have been found) they often dressed in cloth tunic, breeches, and cap; that they buttoned their garments or encircled their necks with rows of boar tusks (one of which has been found with each tusk adorned with a figure of a different animal, for some of them were real artists in bone-carving); that they traded in sea-shells for adornment (so far are these found from the nearest seacoast); and that they buried their dead with reverence and with belief in the continued life of the soul (for a tomb has been found at the end of a dwelling cave under the Belgian clay, with a slab that fitted over it, the skeletons arranged in rows, and a vase beside them which bore a hole on each side of it, whereby it must have been hung from the roof to contain either food or drink, as was the custom in burials of the New Stone Age). All this may be read in Dawson's "Meeting Place of Geology and History," combined with Gath Whitley's paper on palaeolithic remains in Belgium, published in the "Transactions of the Victoria Institute" for last year.

Silt Left by Flood.

Five years ago, at the meeting of the British Association in Cambridge, I had the pleasure of attending a lecture and handling the exhibits of a lady who had for many months past, under the advice of the late Sir John Evans, been excavating a Palaeolithic find near Ipswich. The heavy stone tools were all found upon the sloping bed of an ancient lake about twelve feet below the present surface of the ground. In the brief discussion that followed the lecture, Professor Boyd Daw-

kins, who is perhaps the greatest living authority, remarked (neither Sir John Evans nor anyone else demurring) that every find of remains of the old stone age that he had examined in Britain lay above all glacial deposits; and, on the other hand, at another meeting of the association I heard him say that an immense gap (namely, of earthy deposit) everywhere separated the remains of the Old Stone Age from those of the New. This is exactly what we should expect, if the Old Stone Age was the age before the Flood.

Again, these implements of Ipswich were found under a clay that covers the tops of hills over a very large area—the Suffolk tableland; and there are no hills higher than it from which it could have come as a glacial moraine. It must, therefore, have been washed thither by a mighty, all-pervading flood.

Whence Came the Waters?

If it be asked, whence did the waters come that engulfed the earth, since the Bible mentions the breaking up of "all the fountains of the great deep" before the opening of the windows of heaven, since glaciers and icefields may fitly be called fountains (or sources) of the great deep, and since, when the ice retreated from half of Europe and Asia and two-thirds of North America, it is calculated by Wright to have raised the ocean at least 250 feet all the world over (some geologists putting it three times as high), this, together with the enormous subsidence of the dry land which we have proved and which itself caused the ice to melt, beyond doubt formed the chief agency by which the Creator overwhelmed "the ancient world."

What Niagara Proves.

And as to the time when the great catastrophe occurred, the rate of recession of Niagara, which has been accurately determined for the present generation by four official geological surveys and which from the smaller thickness of compact rock that the stream had formerly to work through was probably greater in early ages than now, gives a total period considerably under 7,000 years from the time when the Niagara River was falling over the cliffs of Lake Ontario. It was probably much shorter; for over about a mile and a quarter of its track

it had to hollow its way only through an old glacial moraine These facts, together with confirmatory observations made by Professor Wright upon the rate of erosion of a stream near Oberlin that thirteen years ago was diverted through strata similar to those of Niagara, were set forth by him early in last year, first to the members of the Victoria Institute and then to those of the Geological Society of England. I had the honor of hearing both lectures; and I can testify that after the second Sir James Geikie (twice President of the latter society) gave his opinion that our estimate of the lapse of time since the great ice age must be very much shortened, while two other speakers concurred with him, one at least giving a confirmatory observation of his own, whereas only one opposed the opinion, and that not very strongly.

Universality of Tradition.

It would indeed be astonishing if science did not prove the truth of a story that is found not only in the pages of the Holy Bible, but with the same outlines, and at times with the like details, all over the earth, among tribes that differ widely in language, religion, and customs, and have for untold centuries been kept apart by vast tracts of sea and land. If this were the result of spreading stories of adventure or miracle from land to land and nation to nation, then we should have expected the wonderful story of the crossing of the Red Sea or of the falling of the walls of Jericho to travel to China, India, North America, or the heart of Africa. But it is only the stories of the Fall and the Flood, with sometimes that of Cain and Abel, of the curse of Canaan, or of the building of the Tower of Babel—only these, that have travelled round the globe—that is, only the stories of events alleged by the Bible to have happened to all mankind. The conclusion is inevitable —the nations at large have those alone because these are just what they brought from a point of common origin. That point, then, will surely be fixed by the discovery that these stories when narrated by the peoples round about it have the most details in common. Now directly we get outside the Mahometan tribes who surround ancient Babylonia, and who of course accept the story in Genesis as we do, we find the traditions of the Masai in Africa and of the Beloochees in India concurring with Genesis and with the poetical narrative of the

Babylonians in many more details than any traditions further afield: they contain, for example, the temptation of the first human pair by a serpent, the fall of the woman before the man, the killing of Abel by Cain, and the appearing of the rainbow after the Flood (see Dr. Emil Reich's articles in The Contemporary Review for 1905, and the volume of his lectures given at Caxton Hall just afterwards). So we are brought to Babylonia or to some spot very near it where the Genesis account was written. But it is in Babylonia that Genesis itself places the starting point of the dispersal of mankind—an event recorded by the Assyrians, though not (so far as we have yet found) by the Babylonians, as is natural, seeing the discredit that it threw upon Babylon. (See Budge, "Babylonian Life"; Sayce, "Fresh Light.")

The Babylonian Story.

Thus the Bible is proved correct as to this most momentous point; and whoever will dispassionately examine the Babylonian poem of the Flood, with its addition of slaves and concubines to the good man's family, with its gods who themselves flee in terror from the catastrophe, but who afterwards "gather like flies" around the sacrifice, and among whom the good man discriminates in his reverence against one for not bringing a pestilence instead of an all-destroying flood, will at once perceive that the pure, dignified, full, and consistent account given in Genesis is the original record of a most solemn event in the career of humanity, transmitted by the Creator for the warning and instruction of all the future race. (See Sayce, "Fresh Light from the Ancient Monuments," "Assyria and its Princes," etc.)

Mr. Jackson further rejects the Flood as true history, because the last king of Babylonia makes the first reign a long while before the Hebrew date of the Flood. This is doubly strange; for not only did the Babylonians themselves believe in the Flood and tell a story thereof very like the one found in Genesis, even to the detail of the covering of the ship inside and outside with pitch, but they had even a list of the kings that reigned before the Flood.

Reigned Before the Flood.

Berosus speaks of their having had ten kings then who unitedly reigned for about 1,100 years (1,200 years of 360

days each; and a Babylonian tablet has actually been found, unfortunately much broken, especially at the top, on which an upper list of royal names is divided from a lower one by the words, "These are the kings who reigned after the Flood." (See Wallis Budge, now Curator of the Oriental Antiquities at the British Museum, on "Babylonia Life and History," as also Pinches on "The Old Testament and the Monuments.")* But the fact is that since Amraphel of Genesis xiv. has been identified with Khammurabi, or Khammurapalti, of the first dynasty, and his three companions likewise as all contemporary rulers of the countries assigned to them in that chapter, it depends whether we believe or not in the exceedingly doubtful second dynasty, whether we are to place Abraham 500 years earlier than does Hebrew chronology or 500 years later than does Babylonian chronology.

Further back than this first dynasty, which began 117 years before Khammurabi's accession, or, say, 110 before his war in Canaan, all is confusion or emptiness; and the British Museum list of the kings, besides lesser gaps amounting to about 300 years, presents us with a continuous gap of 1,250 years without a single monumental record or name—that is, over a period as long as from the first preaching of Christianity to the Anglo-Saxons down to the accession of Queen Victoria. For such a

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*In my original letter this was published as "before." Through its temporary absence from the university library, I had not access at the time to Pinches' work, where the tablet is reproduced (at page 85); but I quoted from my remembrance of a lecture by Rev. John Tuckwell, a pupil of Pinches' in Assyrian, who showed a lantern photograph of the tablet translated by Pinches. Pinches says that "it is inscribed with the names of Babylonian kings in Sumerian and Semitic Babylonian. The thirteenth line (that running across two columns) has the statement, 'These are the kings who were after the flood. They are not written in their proper order.'" Again, Budge, when speaking of Babylonian chronology, says, "The names of the kings that followed *close after* the flood are given: 1. . . .—Sin, 2. . . .—Sin, 3. Amil-Gula, 4. Samas-nasir, 5. Amil-Sin, etc." The main point is that the Babylonians regarded the flood as a great break in the history. Berosus, the Chaldean, gives his own names to the ten kings who reigned before the flood; yet these are probably the ten patriarchs troy of mankind, quickly followed by the resumption of their own of the Bible, for to the last one be ascribes the experiences of Noah.

dummy of history as this, Mr. Jackson would fain have us set aside the continous chronology and momentous record of events contained in the Holy Book of God.

This letter, for want of space, was shorn of a first paragraph, in which I gave examples where nothing but acceptance of the Old Testament stories as literal history could have been in the mind of Christ and His apostles—such as "from the blood of Abel the righteous to the blood of Zachariah, the son of Berachiah, whom ye slew between the sanctuary and the altar" (Matt. 23:35), "death reigned from Adam until Moses, even over them that had not sinned after the likeness of Adam's transgression" (Rom. 5:14). "Enoch also, the seventh from Adam" (Jude 14). I may have cited, "If God . . . spared not the ancient world but preserved Noah with seven others, a preacher of righteousness, when He brought a flood upon the world of the ungodly" (2 Peter 2:5).

THE AGE OF NIAGARA FALLS.

(The Globe, Toronto, 13-3-09).

To the Editor of The Globe: In a communication recently published in The Globe, reference was made to the age of the Falls of Niagara. It may be of interest to many persons to know some of the results of the more recent investigations concerning this problem. The latest and most reliable estimate is probably that of Dr. J. W. Spencer, of Washington, who, in his monograph, published by the Dominion Geological Survey in 1907, gives thirty-nine thousand years as the age of these falls. In a previous work, which appeared in 1894, Dr. Spencer had given thirty-one thousand years as his determination. But new facts were obtained in the meantime, which considerably affected the results. The rate of erosion of the rocks depends upon the volume of water, as well as upon its velocity, and upon the character of the rocks. Many years ago, when Sir Charles Lyell made a guess of thirty-five thousand years, it was supposed that the volume of water had never varied much. But it is now known that for a very long period of time, somewhere about three-fourths of the entire age of the falls, the waters of Lake Huron flowed through the Nipissing, Mattawa, Ottawa Valley, and not into Lake Erie. In other words, Lake Erie and Niagara River had but a very small volume of water. During that Lake Erie stage the volume of water passing over was only 15 per cent. of that of the present time. Consequently the rate of erosion was very small, only about six inches yearly. This stage of the history of the falls was, therefore, of long duration, namely, 35,500 years. Other ancient channels of rivers which formed outlets for Lake Erie have also been discovered in the Niagara peninsula of Ontario. By the study of these, and of the Huron beaches near Lake Nipissing, very valuable data have been obtained.

If Lyell's guess of the rate of erosion as about a foot each year had been correct, his estimate of 35,000 years would have been correct. But his rate of erosion was not correct. At the present time the rate of the Canadian Falls erosion is about four feet, and that of the American Falls is about seven inches yearly. It has turned out, however, that Lyell's estimate, based upon insufficient data, happened to be near to the figures found by Spencer, which are the result of the discoveries and investigations of Spencer, Taylor and Gilbert during recent years.

There is, therefore, no longer any use in discussing the conjecture of some, that the falls are only 7,000 years. It may now be said with considerable certainty that Niagara Falls are 39,000 years old. As Prof. Spencer has stated, this question has been brought out of "the realm of speculation into one of inductive science."

HENRY MONTGOMERY.

Toronto, March 8, 1909.

THE AGE OF NIAGARA.

(The Globe, Toronto, 20-3-09).

To the Editor of The Globe: Since you kindly published my long letter on March 6, which dealt with the scientific proofs and some other attestations of the Biblical story of the Flood, only one reply has appeared thereto in your columns—a letter from Professor Montgomery of the University of Toronto, dealing wth the recession of Niagara. He objects that Dr. J. W. Spencer, of Washington, has calculated that during three-fourths of the entire age of the falls the waters of Lake Huron flowed through the Nipissing, Mattawa and Ottawa Valley, and not into Lake Erie, and this raised the total period of Niagara recession to 39,000 years. Professor Frederick Wright, of Oberlin, to whom I have since communicated this objection, now writes to me in reply the attached letter, which I beg you to publish. My notice of the lecture that I heard him give to the Geological Society of England was necessarily brief; but I would now add that he fully disposed of Dr. Spencer's enlargement of the period of recession in that lecture, and that the President and two other speakers upheld him, one more inclining to Dr. Spencer's view, and a fifth and last remaining neutral.

So convinced was the President, Dr. Geikie, of the comparative shortness of the interval since the final break-up of the great ice age, that he told the assembly that he hoped to get a Swedish professor soon to lecture there who claimed to have found marks that have measured the period geologically year by year, the eastern coast of Sweden, as is well known, having been slowly rising during many centuries, and, as he claims, ever since the ice age.

And I would further add that if, as is supposed by Dr. Spencer, the Niagara River for the lowest two-sevenths of its course had a far smaller stream than now, then the lowest two miles of its channel would now be

most strikingly narrow and deep as compared with the upper five miles, since the body of water when greatly swollen, finding a bed ready to plunge into, would have converged into this and done much more hollowing in its bed than in its sides. But no such conspicuous narrowing or deepening do we find, that I am aware of.

Since Professor Wright was, as his letter shows, himself the discoverer of the diversion of Niagara, of which Dr. Spencer makes so much, he has the best right to speak on the subject.

MARTIN L. ROUSE.

Toronto, March 19.

"In regard to the age of Niagara, I would say that you will find it briefly treated in my 'Scientific Confirmations of Old Testament History; but Mr. Spencer's book, which has appeared since then, does not materially affect my calculations. He admits the rate of erosion which I state, and that it has proceeded down to within about two miles of the mouth of the Gorge. Then he brings in theoretical considerations which would prolong the period of that erosion 30,000 or 35,000 years, but all that is based upon the supposition that the diversion of water through Georgian Bay, Lake Nipissing and the Ottawa River, continued for that length of time. The reason for that diversion was that at the close of the glacial period the land was depressed more to the north than to the south, drawing the water off in that direction. This continued until the land had regained its present altitude, when the water took its course through the Niagara River. The whole force of his supposition depends upon assuming a very slow rate in a re-elevation in that northern region; but Mr. Warren Upham, in his monograph on Lake Agassiz, published by the United States Geological Survey, and in his report to the Canadian Government, brings forward a large amount of evidence that seems to prove conclusively that after the melting of the ice that northern region rose much more rapidly than Mr. Spencer supposed. Indeed, he shows that not over 1,000 or 2,000 years will be required for a re-elevation of the land, so that Mr. Spencer's theory is without support. It is well enough to say that this northern outlet was my discovery published in a report to the Geological Society of America fifteen years ago, and that in all my calculations I have had that in mind.

"G. FREDERICK WRIGHT."

THE AGE OF NIAGARA.

(The Globe, Toronto, Saturday, April 3, 1909).

To the Editor of The Globe: There recently appeared in The Globe a communication embodying a letter from the Rev. Geo. Frederick Wright, D.D., a professor of Oberlin Theological Seminary, in which communication it is claimed that "since Professor Wright was, as his letter shows, himself the discoverer of the diversion of Niagara, he has the best right to speak on the subject." I desire to correct this statement. Prof. G. F. Wright

discovered shore-lines near Nipissing in 1893, but he did not first discover the diversion of the water of the Upper Lakes from the Erie route. The discovery was made by Professor Spencer five years before that time, and publicly reported and recorded by Prof. Spencer. The official report of the proceedings of the American Association for the Advancement of Science for the year 1888 shows that Dr. Spencer reported his discovery of the diversion of the waters at the annual meeting of the association held in Cleveland in August of that year. In that volume, which may be seen in any good college or public library (volume 37, pages 197, 8 and 9, for the year 1888), the account is given of the ancient course of the St. Lawrence River and recent discoveries of a deep channel on the northern side of Lake Ontario, and at the foot of a high, submerged escarpment in Lake Huron and Georgian Bay, and so on, showing that the ancient St. Lawrence during a period of high continental elevation rose in Lake Michigan and flowed across Lake Huron and down Georgian Bay, and a channel, now filled with drift, to Lake Ontario, thence by the present St. Lawrence Valley to the sea, the old Lake Warren having become dismembered, the Lakes Huron, Michigan and Superior forming one lake, and the Erie basin lifted out separately from Lake Warren. In the following year Dr. G. K. Gilbert published a paper, in which he stated that in the ancient system of drainage Superior, Michigan, Huron and Georgian Bay constituted a lake system by themselves, independent of Erie and Ontario, both of which latter were greatly reduced in size, constituting another chain, their connecting link, the Niagara River, being a comparatively small stream.

If, as has been claimed, to be the discoverer of the diversion of the Upper Lakes' water from the Niagara route, gives one the best right to speak upon the age of Niagara, surely Spencer has this right, for the published official records show Spencer to be the discoverer. Besides, he has conducted his researches in the field recently in the light of all previous knowledge, with the advantage of the accumulated fruits of the labors of others. It is an admitted fact that the waters of Lakes Huron, Michigan and Superior, then one large lake, flowed through northern and northeastern Ontario, and not through Lake Erie, and that, in consequence, the volume of water passing over the Falls of Niagara was very small and the rate of erosion very little.

The present writer has heard the Rev. Dr. Wright speak upon the subjects of geological time. He is also acquainted with Dr. Warren Upham and his work. Yet there does not appear any good reason to shorten the time appreciably. There can be no room to question that the time required was indeed very great.

(Signed) HENRY MONTGOMERY.

Toronto, March 27.

The interval from the publication of Professor Wright's and my own joint letter down to the appearing of the above communication was so considerable, that I had ceased to look for a rejoinder, and several days

elapsed ere I was aware that one had been made. But, in any case, the correspondence was declared at an end; so Professor Wright, who has evidence of the extreme shortness of the diversion of the drainage of the Great Lakes northward of Niagara River, was precluded from bringing it forward. Professor Montgomery has, however, overlooked my own arguments against a prolonged diversion, namely, the absence of great narrowing and deepening in the lower third of the Niagara Gorge, from some point where the volume of water should have been quickly and vastly multiplied.

M. L. R.

The Age of Man.

(*From the Toronto "Globe," November* 5, 1909.)

To the Editor of The Globe: Is it possible that the preachers of human evolution are beating a retreat, and will soon capitulate? We are informed by a London special cablegram appearing this week in the Toronto press that the most ancient human skull yet discovered has just been found near Heidelberg, in Germany, which, though it has "a large, thick jaw, without a trace of chin formation," and therefore seems akin to the anthropoid ape, yet has its "complete set of teeth agreeing" in shape and arrangement "with those of the human race to-day," and "in marked variation from those of any of the anthropoids," so that anthropologists are coming to "regard human dentition as more primitive than that of the ape family, and it is admitted that no anthropoid stage immediately preceded the age of the Heidelberg man." But by the same showing, how could it have preceded it at all, unless ape teeth are both less primitive and more primitive than human teeth? It was only last March that The Illustrated London News treated us to a reconstructed picture, in colors, of the Pithecanthropus erectus, or "upright ape-man," some of whose bony relics had been found in an East Indian isle, as the immediate ancestor of early man, covered with long monkey's hair and crouching behind a rock, in seeming uncertainty whether to attack its prey with a stone club or with its monstrous mouth and teeth.

And now we are told upon similar authority that the present system of human teeth, and therefore the mouth that suits them, are too primitive to be so derived. And it was proved several years ago by Doctor Walter Kidd, F.R.Z.S., in a special and well-illustrated work upon the subject, that, over their heads and trunks at least, the hair of men and of apes from the earliest stages of their lives was arranged upon a totally different plan. But, as the London despatch continues, besides the Heidelberg skull, one has recently been found at Chapelle aux Saints, with large jaw, no chin, and wide nasal apertures and brow arches, which serves as a link between the Heidelberg skull and the one long since found in the Neanderthal, in which last the changes are "so numerous and so marked that the million of years suggested as the age of the Heidelberg skull seem reasonably justifiable." But we were previously assured that the beetling brows of the Neanderthal skull were a sign of very low organization; and 150,000 years was the approximate period which the agnostic biologist Dr. Ray Lankester recently allowed for development from its owner and his contemporaries upward to the men of our day. So the Heidelberg folk must first have taken 850,000 years to degenerate into Neanderthal men, in order that in the remaining 150,000 they might progress backwards into our folk.

Your correspondent's words imply that the Neanderthal men had very wide nostrils; but, as we possess only the top half of a Neanderthal skull, we cannot be quite sure of this. And one may add that years ago Sir Daniel Wilson, who was esteemed one of our greatest anthropologists, in the course of a lecture at the Canadian Institute, showed that one could not be certain that the Neanderthal man had even very abnormally arched eyebrows, seeing that so much depended upon the angle at which one held the skull-top. And, strange to say, De Quatrefages found in it a resemblance to the skulls of three eminent modern Europeans, of whom one was the great Robert Bruce (The Human Species, 309-310, cit. in Trans. Vict. Inst., 1908, p. 38). But, even at an epoch so vastly remote, men, says your correspondent, possessed some beginnings of civilization; for both at La Moustiere and at Chapelle aux Saints they were found to have buried their dead with reverent care, and either with tools or food by their side, thus displaying "a belief in the wants of the dead" (which, of course, in turn

flowed from a belief in the continued existence of the soul). This evidence might be added to: and one might further note that, while their numerous and well-made bone needles point to their having used clothing, this was rendered certain by the discovery made by M. M. Piette and Laporterie and reported to the French Anthropological Society in 1894; for in the cave of Brassempouy in western France they found, along with mammoth bones and palaeolithic tools, broken ivory statuettes representing men wearing cloth tunics and breeches and women wearing cloth hoods. No reason is given by your correspondent for assigning so vast a length to the interval between the Heidelberg men and ourselves, other than the time needed for the due evolution or *oscillation*. But the usual reason assigned is the supposed distance of the pre-glacial (or rather the inter-glacial) epoch from our own. As to this however, I can as a listener testify that when last year Professor G. F. Wright placed before the Geological Society of England his calculated estimate of the final break-up of the glacial epoch as probably no more than six thousand, and certainly no more than ten thousand, years ago, he was upheld by the President and the majority of the speakers that followed him. And, as Sir Henry Howorth and our own Sir William Dawson long since pointed out, the sheets of sand and mud under which these relics of ancient man lie strewn are just what would have been produced by Noah's flood. But let us look at a curious result that follows even from supposing (with Lord Avebury, for instance) that mankind has been on the earth as long as 50,000 years.

According to the last census for all civilized peoples and to expert calculations for all barbarous ones, there were upon the earth at the close of 1900 A.D. 1,564 million human beings; and for the same period in all European nations taken together which publish returns—namely, all the central and western ones and three of the Balkan States—the average excess of births over deaths was 10.74 in every thousand of the population every year.

Taking 50,000 years, then, as the interval since the first human couple began to form the first household, on an average every original unit will have added to itself in every year one-xth part of the size which it had in the just previous year; one becoming in the next year after the starting point

one and one-xth, and this sum again adding in the second year one-xth of itself, and so on, at compound interest, up to the 50,000th year inclusive. So in the end we shall have the original couple multiplied by one and one-xth 50,000 times, equalling 1,564,000,000. Then, by a simple logarithmic process, dividing 1,564 millions 50,000 times over, we find one-xth of the actual increase to equal 0.4095 in every thousand persons; so, because the actual increase goes by couples, the actual number of persons born more than die in every thousand per year will be 0.819, or considerably less than one—a figure that need only be mentioned to be scouted by every thoughtful mind.

On the other hand, taking the interval since Noah's Flood to be what the common chronology makes it (only with the addition of four years, so as to place Christ's birth not in B. C. 4, but near the end of B. C. 8, the year now ascertained for Quirinius' household "enrolment"), we have a period for the requisite repeopling of the earth since the Flood of 2,344 plus 7 plus 1,900, or in all 4,251 years; and, starting with Noah's three sons and their three wives as the fresh progenitors, we get six multiplied by one and one-xth 4,251 times over equalling 1.564 millions; and, by the same process as before, the annual increase here works out to 4.569 couples in every 1,000 persons per year, or 9.138 persons born in excess of those who have died in every 1,000 per year—a thoroughly reasonable figure, it being nine-elevenths of what prevails in Europe now.

No doubt, as a whole, wars were more prevalent in days of old than now, and pestilences worked more havoc in the towns. But, conversely, because prior to the last century a far smaller proportion of the inhabitants of every country lived in the towns, the natural increase of population was far greater and mortality among children far less. At the close of last century, indeed, one of the greater nations from which our average for Europe is taken—namely, France—became stationary, making no increase in its inhabitants.

One million is the minimum and two millions the maximum at which the inhabitants of England proper have been set by historians, after examining Domesday Book, for the date at which it was compiled—1085 A.D. And, if we take the mean, 1,500,000, and suppose it to have increased at the annual rate just ascertained (4.569 per 1,000 per year), we shall find

that in the year 1900 they would become 61,606,743 persons, which is probably a good deal less than are now altogether found of true English descent in Great Britain and her colonies and the United States and scattered over foreign countries. Thus do mathematics bear out the statements of Holy Writ, when plainly taken, against "oppositions of the knowledge which is falsely so called."

MARTIN ROUSE.

Toronto, Nov. 2.

For want of mathematical signs among the type used by The Globe type-setting machines, one could do no more than give the stating and the result of the above equations. They are now given below in full in the usual way.

The reason for stating that "the actual increase" goes by couples and for finally doubling it to obtain the apparent increase in the same regular interval—one year or ten years or a generation of 33 years, or whatever interval we agree upon—will be best understood if we take an even integral figure of increase. Suppose that, starting again from three married couples, we found that in four successive generations those who survived into each were in every case ten times as numerous as those who survived into the just preceding generation, this would not make the first six persons become $6 \times 10 \times 10 \times 10 \times 10 = 60{,}000$ persons; but the first three couples would on an average have had

5 sons and 5 daughters apiece,
or 15 possible couples,

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who in the second generation (though some might remain unmarried)
again yielded 5 sons and 5 daughters each,
making up $15 \times 5 = 75$ possible couples,

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who in the third generation became $75 \times 5 = 375$ possible couples,
who in the fourth became $75 \times 5 \times 5 = 1775$ possible couples,
or $2\ (1775) = 3550$ persons.

Our first equation, then, runs :

$$2(1+\tfrac{1}{x})^{50,000} = 1{,}564{,}000{,}000$$

$$(1+\tfrac{1}{x})^{50,000} = 782{,}000{,}000$$

the logarithm of $1+\frac{1}{x}$ = the log of $782{,}000{,}000 \div 50{,}000$

$$= 8.8932068 + 50{,}000$$

$$= 0.00177864 \ldots$$

therefore $1+\frac{1}{x} = 1.0004095$ [natural number]

and $\frac{1}{x} = 0.0004095$

Thus the actual increase by couples is 0.4095 per 1000 per year or, there would have been added to every 1000 of the population only 0.819, or less than one person in each year.

Our second equation runs :—

$$6(1+\tfrac{1}{x})^{4251} = 1{,}564{,}000{,}000$$

$$(1+\tfrac{1}{x})^{4251} = 260{,}666{,}666.6$$

the logarithum $(1+\frac{1}{x})$ = log of $260{,}666{,}667 \div 4251$

$$= 0.0019798$$

therefore $1+\frac{1}{x}$ = 1.004569 [natural number]

and $\frac{1}{x}$ = .004569

Thus the actual increase by couples is 4.569 per 1000 per year, or there would have been added to every 1000 of the population 9.138 persons, the average now added in European countries being 10.74 persons.

The lapse of time between the Domesday survey and 1900 A.D. being 815 years, our third equation runs :—

$$x = 1{,}500{,}000 \times (1.004569)^{815}$$

log. of x = log. of 1,500,000 + (log. of 1.004569×815)

$$= 6.1760913 + (0.0019798 \times 815)$$

$$= 6.1760913 + 1.6135370$$

$$= 7.7896283$$

$$x = 61.606{,}743$$